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Bianca et al.

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(54) **SYSTEMS HAVING AN ACTUATOR FORCING A RESILIENT RETAINER THROUGH A COMPRESSOR TO SECURE ELECTRICAL CONTACTS IN AN ELECTRICAL COMPONENT**

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H01R 13/426 (2006.01)
H01R 43/20 (2006.01)

(52) **U.S. Cl.**
CPC ***H01R 13/426*** (2013.01); ***H01R 13/6277*** (2013.01); ***H01R 43/20*** (2013.01)

(58) **Field of Classification Search**
CPC H01R 13/627; H01R 13/6277
USPC 439/349–358
See application file for complete search history.

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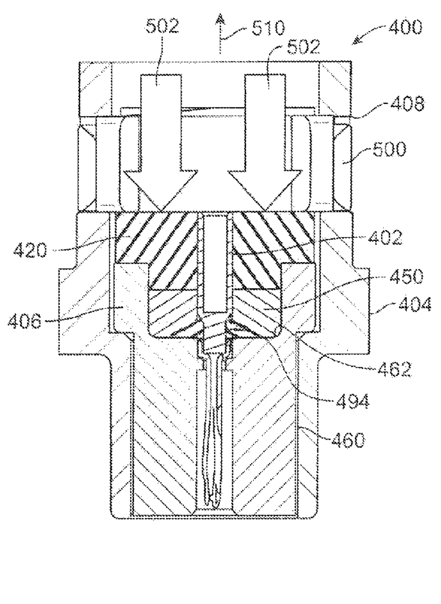
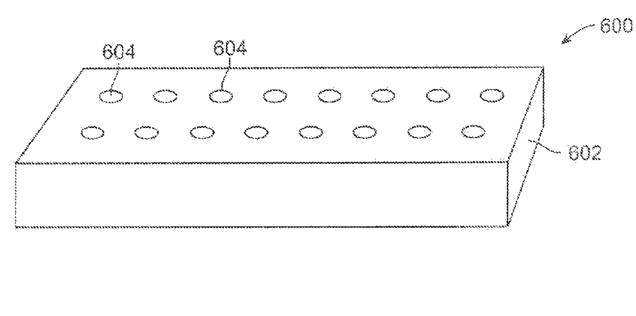
Primary Examiner — Chandrika Prasad

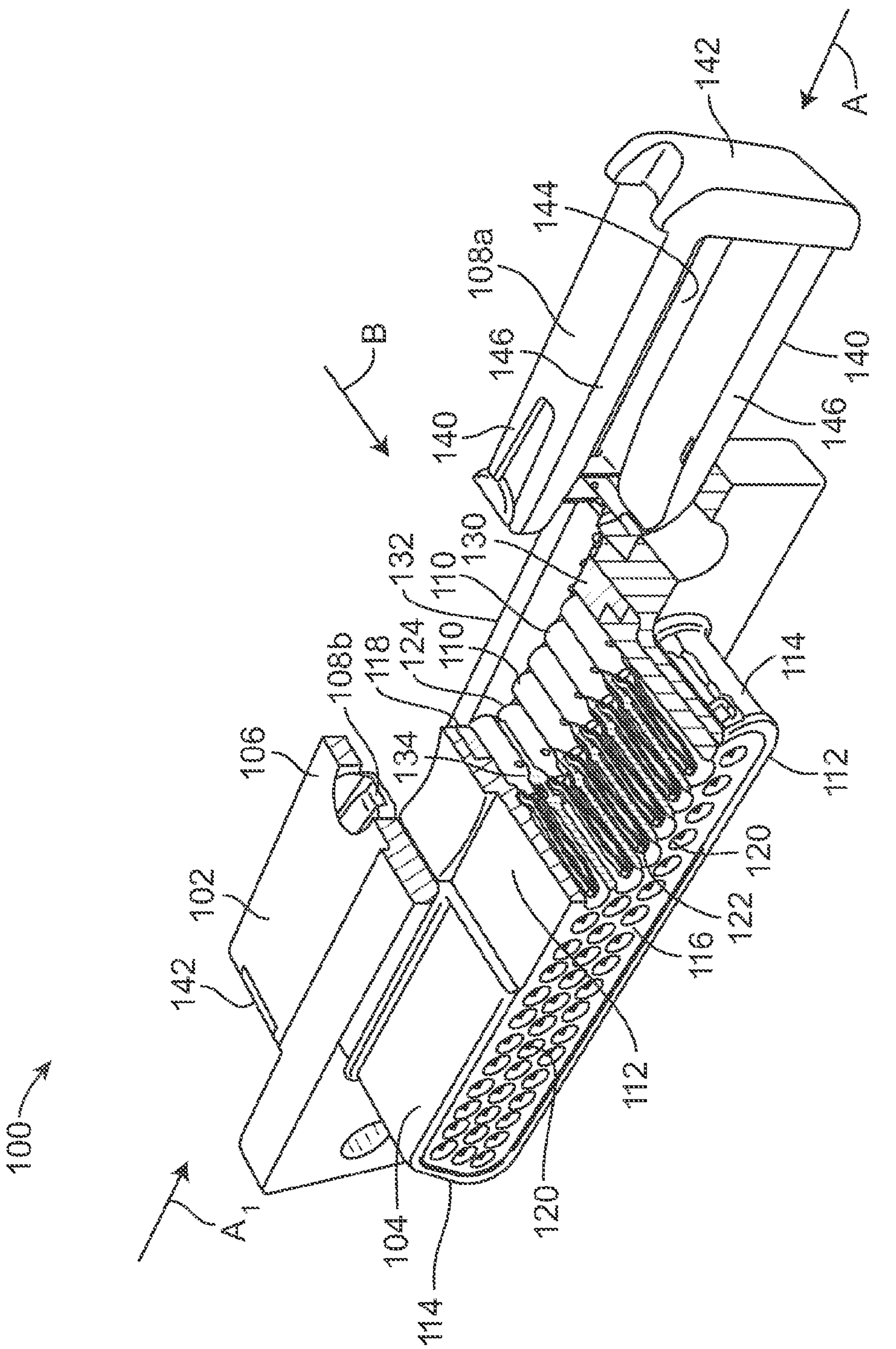
(57) **ABSTRACT**

A system for securing one or more electrical contacts within an electrical component includes a main housing defining a contact-retaining chamber, a base fixed within the contact-retaining chamber, a resilient retainer supported on the base and positioned around at least a portion of the one or more electrical contacts, a compressor within the contact-retaining chamber, wherein the resilient retainer is positioned between the base and the compressor, and a moveable actuator configured to be moved into a retaining position in which a retaining force is exerted into the compressor. The retaining force is translated into the resilient retainer to securely retain the electrical contact(s) within the electrical component.

13 Claims, 6 Drawing Sheets






100
102
104
106
108a
108b
110
112
114
116
118
120
122
124
130
132
134
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142
144
146
A
A_1
B

FIG. 1

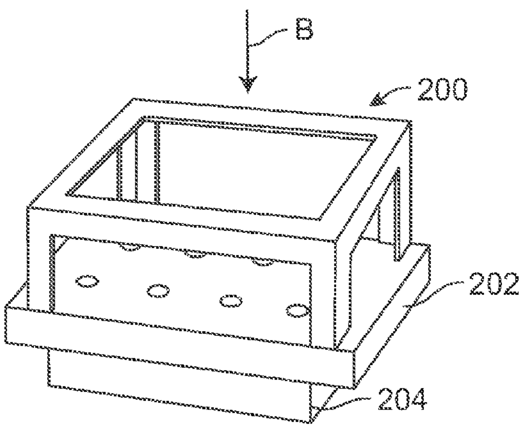

FIG. 2

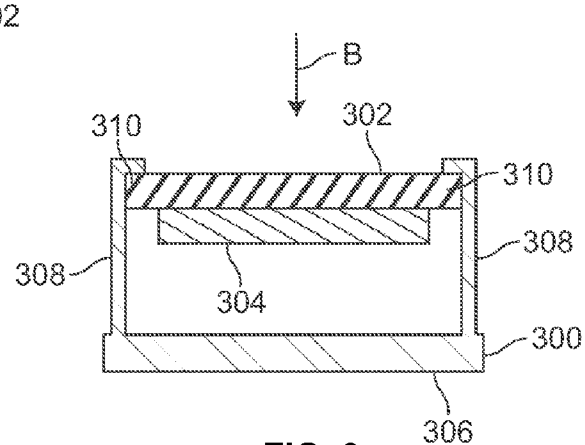

FIG. 3

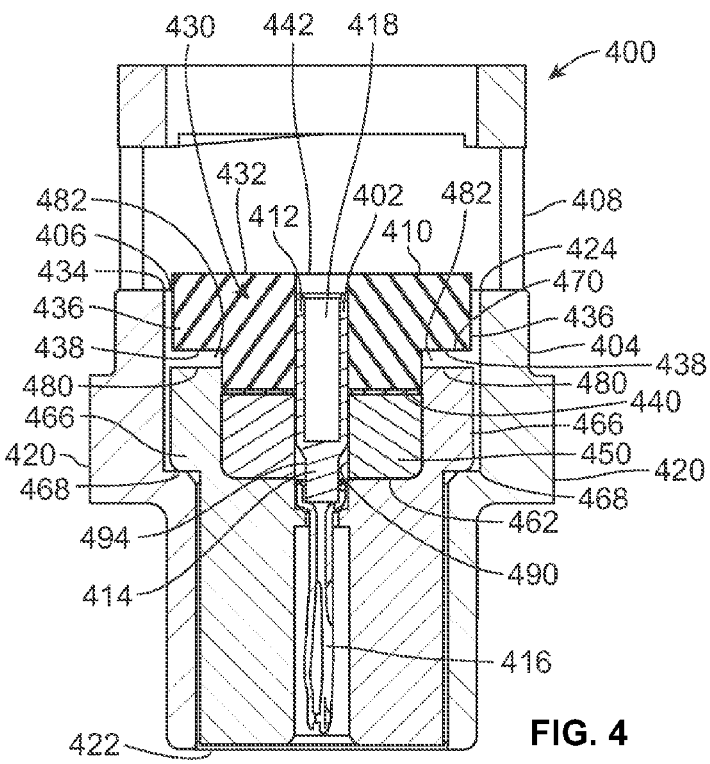

FIG. 4

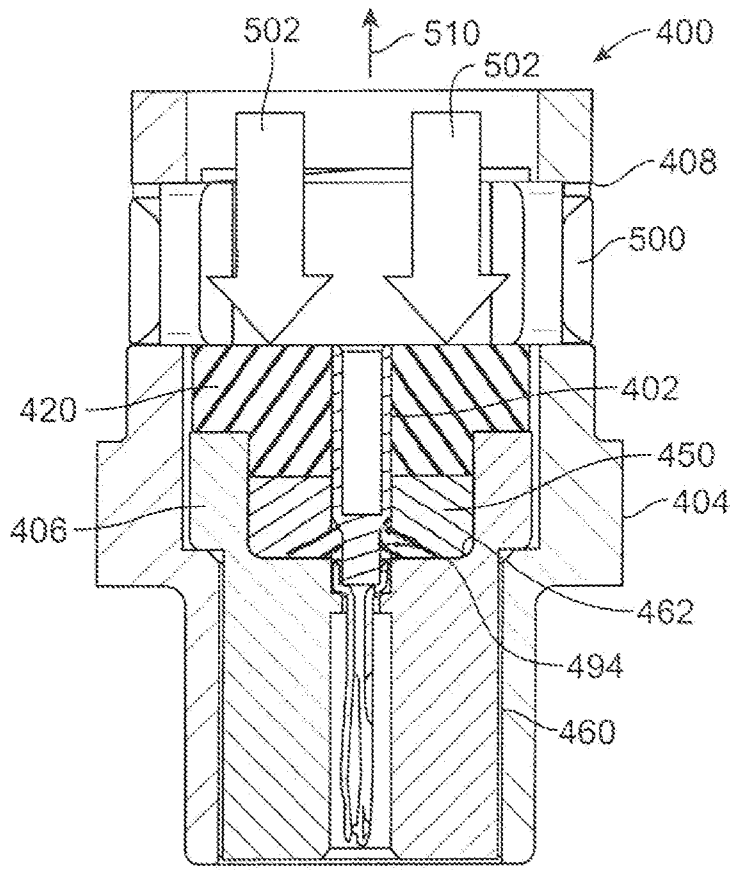
502
510
400
502
408
500
420
402
450
404
406
462
494
460

FIG. 5

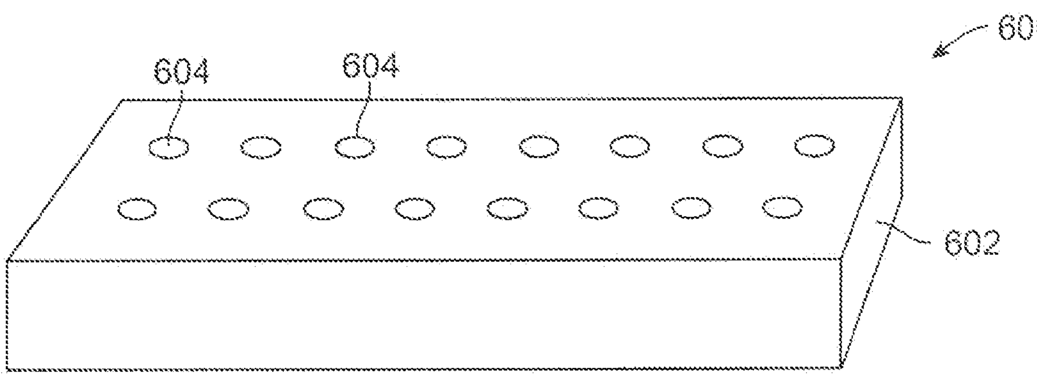
600
604
604
602

FIG. 6

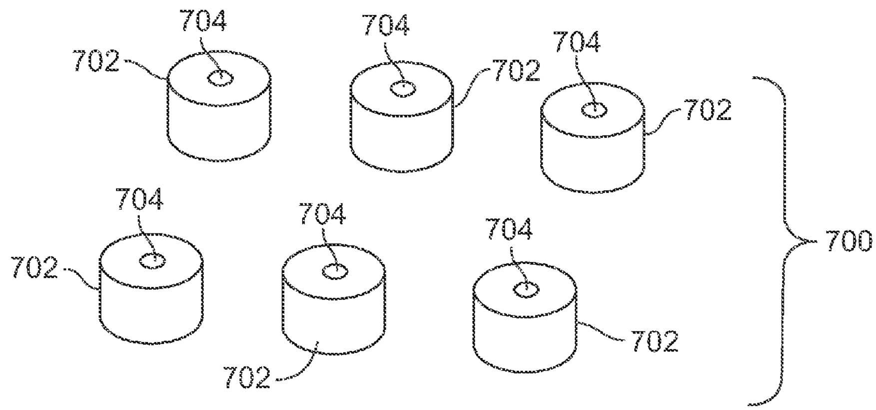
704
702
704
702
704
702
704
702
704
702
704
702
700

FIG. 7

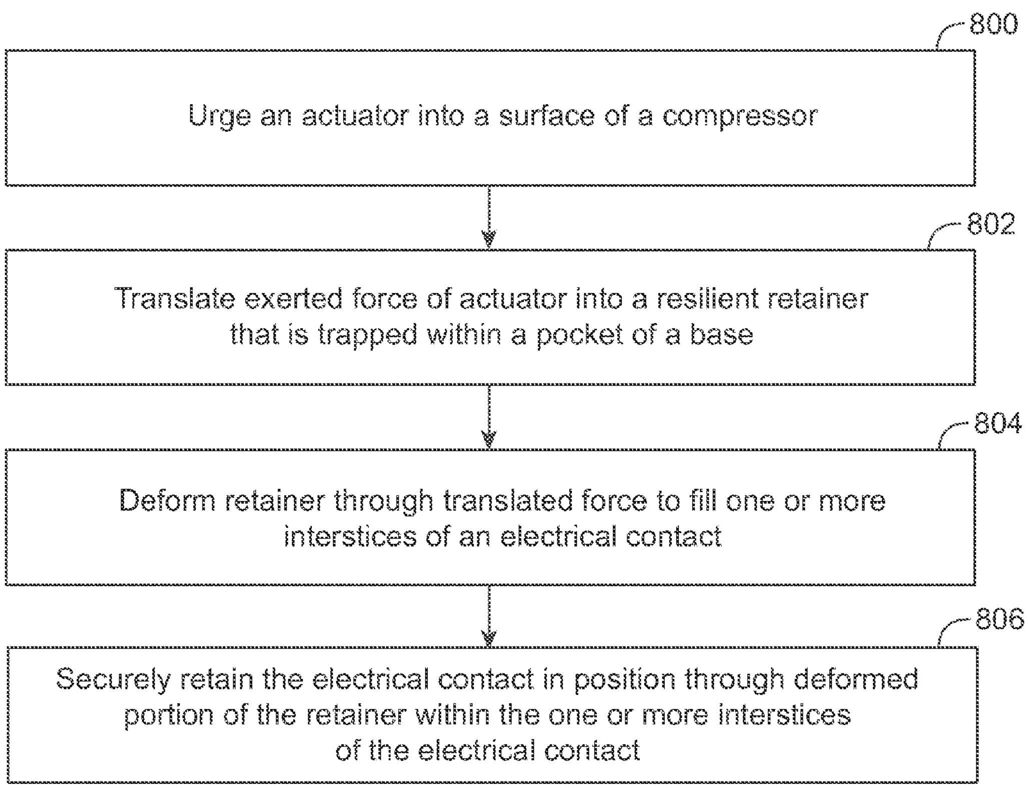
800
Urge an actuator into a surface of a compressor
802
Translate exerted force of actuator into a resilient retainer that is trapped within a pocket of a base
804
Deform retainer through translated force to fill one or more interstices of an electrical contact
806
Securely retain the electrical contact in position through deformed portion of the retainer within the one or more interstices of the electrical contact

FIG. 8

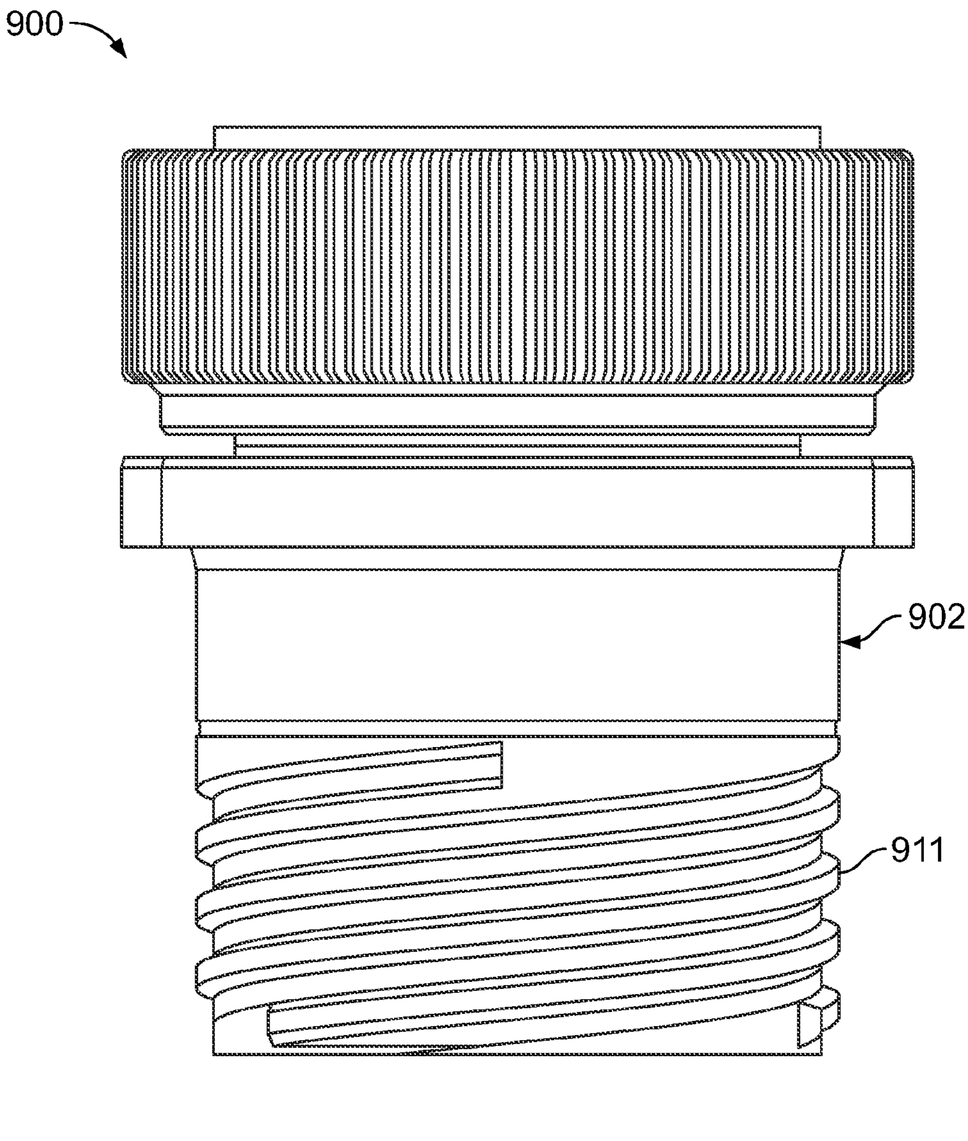

FIG. 9

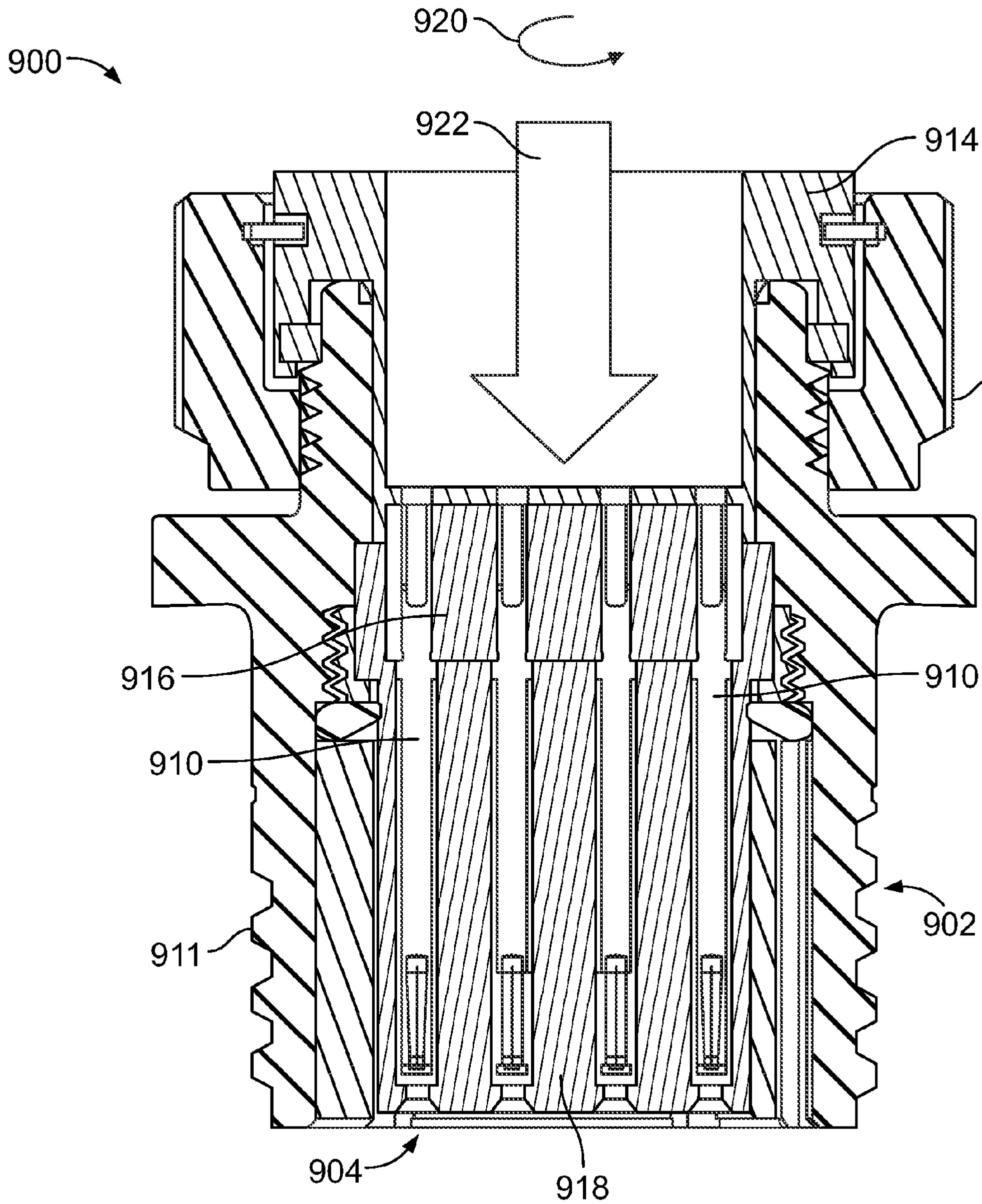

FIG. 10

SYSTEMS HAVING AN ACTUATOR FORCING A RESILIENT RETAINER THROUGH A COMPRESSOR TO SECURE ELECTRICAL CONTACTS IN AN ELECTRICAL COMPONENT

BACKGROUND OF THE DISCLOSURE

Embodiments of the present disclosure generally relate to systems and methods for retaining electrical contacts within electrical components, such as high density electrical connector assemblies.

Various communication or computing systems use electrical connectors to transmit data signals between different components of the systems. An electrical connector may electrically and mechanically connect one electrical component, such as a circuit board, server, or the like to another electrical component.

As data processing demands continue to increase, electrical connectors have been developed with an increased number of electrical contacts. In many applications, a high density pattern of electrical contacts is desired. A high density pattern of electrical contacts is one in which a center-to-center spacing of neighboring electrical contacts creates a thin insulative material between the neighboring contacts.

However, high density contact applications may not provide sufficient space for known contact retention systems and methods to securely retain the electrical contacts. For example, known molded contact retention systems and known retention clip retainer systems are typically too bulky for various high density applications.

A need exists for a practical system and method of efficiently retaining electrical contacts within a high density array or pattern.

BRIEF DESCRIPTION OF THE DISCLOSURE

Certain embodiments of the present disclosure provide a system for securing one or more electrical contacts within an electrical component. The system may include a main housing defining a contact-retaining chamber, a base fixed within the contact-retaining chamber, a resilient retainer supported on the base and positioned around at least a portion of the electrical contact(s), a compressor within the contact-retaining chamber, wherein the resilient retainer is positioned between the base and the compressor, and a moveable actuator configured to be moved into a retaining position in which a retaining force is exerted into the compressor. The retaining force is translated into the resilient retainer to securely retain the electrical contact(s) within the electrical component. In at least one embodiment, the resilient retainer securely retains the electrical contact(s) by deforming and flowing into or otherwise filling one or more interstices of the electrical contact(s) in response to the moveable actuator moving into the retaining position. The resilient retainer may be formed of rubber, for example.

The system may include an actuator track that moveably retains the moveable actuator. The moveable actuator may be configured to slide over the compressor into the retaining position. In another embodiment, the moveable actuator may be or include a plunger that is configured to be pushed into the compressor. In still another embodiment, the moveable actuator is configured to be pulled into the compressor.

In at least one embodiment, the actuator is configured to be rotated into the retaining position. For example, the actuator may include a rotatably cap that is threadably secured to the main housing.

Each of the electrical contacts may include a barrel secured to one or more leads. The electrical component may be or include an electrical connector assembly.

Certain embodiments of the present disclosure provide a method for securing one or more electrical contacts within an electrical component. The method may include defining a contact-retaining chamber within a main housing, fixing a base to or within the contact-retaining chamber, supporting a resilient retainer on the base, positioning the resilient retainer around at least a portion of the electrical contact(s), positioning a compressor in relation to the resilient retainer, wherein the positioning the compressor includes positioning the resilient retainer between the base and the compressor, and engaging an actuator into a retaining position with respect to the compressor. The engaging operation may include exerting a retaining force into the compressor, and translating the retaining force into the resilient retainer to securely retain the one or more electrical contacts within the electrical component. The method may also include disengaging the actuator from the retaining position. The disengaging operation releases the one or more resilient retainer from securely retaining the one or more electrical contacts within the electrical component.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** illustrates a perspective front view of an electrical connector assembly, according to an embodiment of the present disclosure.

FIG. **2** illustrates a perspective front view of an actuator in relation to a compressor and a retainer, according to an embodiment of the present disclosure.

FIG. **3** illustrates a simplified lateral view of an actuator in relation to a compressor and a retainer, according to an embodiment of the present disclosure.

FIG. **4** illustrates an axial cross-sectional view of an electrical connector assembly having an unsecured electrical contact, according to an embodiment of the present disclosure.

FIG. **5** illustrates an axial cross-sectional view of an electrical connector assembly having a securely retained electrical contact, according to an embodiment of the present disclosure.

FIG. **6** illustrates a perspective top view of a retainer, according to an embodiment of the present disclosure.

FIG. **7** illustrates a perspective top view of a retainer, according to an embodiment of the present disclosure.

FIG. **8** illustrates a flow chart of a method of retaining electrical contacts within an electrical component, according to an embodiment of the present disclosure.

FIG. **9** illustrates a front view of an electrical connector assembly, according to an embodiment of the present disclosure.

FIG. **10** illustrates an axial cross-sectional view of an electrical connector assembly, according to an embodiment of the present disclosure.

DETAILED DESCRIPTION OF THE DISCLOSURE

Embodiments of the present disclosure provide systems and methods for retaining electrical contacts within an electrical component, such as an electrical connector assembly, a circuit board, a server, and/or the like. A contact-retaining system may include a resilient retainer that is configured to be urged into or around a portion of an electrical contact, such as an outer longitudinal portion or shaft of the electrical contact. For example, an actuator may urge a compressor, such as a rigid layer of hard plastic, into the resilient retainer. As the resilient retainer is urged toward and/or into the electrical contact, the resilient retainer is blocked by a base that prevents the resilient retainer from passing further therein. The resilient retainer is trapped between the compressor and the base. Because the resilient retainer is confined within a fixed volume of space between the compressor and the base, the force exerted by the actuator into the compressor forces the resilient retainer to deform and flow into or otherwise fill interstices or other such gaps, spaces, or the like of at least portions of the electrical contact, thereby securely retaining the electrical contact in place. For example, in at least one embodiment, the interstices may be features within an electrical contact, such as crimp detents in a wire barrel that are configured to secure a wire to a contact.

FIG. **1** illustrates a perspective front view of an electrical connector assembly **100**, according to an embodiment of the present disclosure. The electrical connector assembly **100** includes a main housing or shell **102** that includes a contact-retaining chamber **104**. The main housing **102** may include one or more actuator tracks **106** that are configured to moveably retain one or more actuators **108***a* and **108***b*. The contact-retaining chamber **104** houses a plurality of electrical contacts **110**.

As shown in FIG. **1**, a portion of the main housing **102** is removed to show internal components. For example, the contact-retaining chamber **104** includes opposed lateral walls **112** integrally connected to opposed end walls **114**, a face **116**, and an opposite surface **118** from the face **116**. The lateral walls **112**, end walls **114**, and face **116**, for example, may be formed of a metal, for example aluminum, and may include an insulating layer. The face **116** includes contact openings **120** that provide passages to ends **122** of the electrical contacts **110**. Opposite ends **124** of the electrical contacts **110** may be exposed through the rear surface **118**.

A compressor **130** may be positioned within the contact-retaining chamber **104** around the ends **124** of the electrical contacts **110**. The compressor **130** may be a layer, beam, strip, sheet, or the like of hard, rigid, non-resilient plastic or metal, for example. As shown, the compressor **130** may be exposed through the rear surface **118**.

A deformable, resilient retainer **132** is positioned between the compressor **130** and a fixed, rigid base **134**, which may be an integral base portion of the main housing **102**. The retainer **132** may be formed of a resilient material, such as rubber or another elastomeric material that is configured to deform, flow, or otherwise move when a compressive force is exerted therein.

Each actuator **108***a* and **108***b* may include lateral beams **140** that integrally connect to a cross handle **142**. The cross handle **142** may connect the lateral beams **140** together such that a space **144** is defined therebetween. Each lateral beam **140** may include a tapered protuberance **146**, such as an ridge, rib, or the like extending along its length. As the actuators **108***a* and **108***b* are urged into a retaining position, the lateral beams **140** slide over portions of the compressor **130**. During this movement, the protuberances **146** force the compressor **130** toward the retainer **132**, which moves toward the base **134**. The base **134** forms a barrier past which the compressor **130** is unable to pass. In short, the retainer **132** is confined or trapped within a space between the compressor **130** and the base **134**. Accordingly, as the actuator **108** is urged over the compressor **130** is urged into the retainer **132** between the compressor **130** and the base **134**. During the compressive sandwiching, the retainer **132** deforms and flows into or otherwise fills interstices of at least portions of the electrical contacts **110**, thereby securely retaining the electrical contacts **110** within the contact-retaining chamber **104**. In short, as the actuator **108***a* or **108***b* is urged into a retaining position over the compressor **130**, the retainer **132** is compressively sandwiched between the hard and rigid compressor **130** and the base **134**, which forces portions of the retainer **132** to move into interstices of at least portions of the electrical contacts **110**, thereby securely retaining the electrical contacts **110** in position.

The actuators **108***a* and **108***b* are configured to slide over the compressor **130** in the directions A and A', respectively, in order to exert a retaining force B into the compressor **130**. The directions A and A' are orthogonal to the direction of the exerted retaining force B.

As shown in FIG. **1**, the actuator **108***a* is in a disengaged position. The actuator **108***a* is not in contact with the compressor **130**. In contrast, the actuator **108***b* (although portions of the actuator **108***a* are not shown in order to show the internal components of the electrical connector assembly **100**) is shown in an engaged position over a portion of the compressor **130**. In order to move the actuator **108***a* into an engaged position, the cross handle **142** of the actuator **108***a* is pushed in the direction of arrow A. Conversely, in order to move the actuator **108***b* into a disengaged position, the cross handle **142** of the actuator **108***b* is pulled in the direction of arrow A.

The electrical connector assembly **100** may include more or less actuators than shown. For example, instead of two opposed actuators, the electrical connector assembly **100** may include a single actuator that is configured to slide over the length of the compressor **130**. Alternatively, the electrical connector assembly **100** may include various other actuators, such as plungers, that are configured to be directly urged into and away from the compressor **130**.

While the electrical connector assembly **100** is shown, embodiments of the present disclosure may be used with various other electrical components. For example, embodiments of the present disclosure may be used with respect to electrical contacts in any type of electrical connector assembly, a circuit board, server, and/or the like. Further, embodiments of the present disclosure may be used with electrical connector assemblies having various shapes and sizes other than shown. For example, the electrical connector assembly **100** may house more or less electrical contacts than shown. In at least one embodiment, the electrical connector assembly **100** may include more or less rows or electrical contacts than shown. Additionally, the shape of the electrical connector assembly **100** may be other than rectangular, square, or linear. For example, the contact-retaining chamber **1045** may have an arcuate shape, such as circular, elliptical, or the like. In at least one embodiment, the electrical connector assembly **100** may have a circular shape, which may allow compression to be performed through a threaded backshell and/or threaded retainer.

FIG. **2** illustrates a perspective front view of an actuator **200** in relation to a compressor **202** and a retainer **204**, according to an embodiment of the present disclosure. As shown, the actuator **200** may be positioned directly over the compressor **202**. For example, the actuator **200** may be aligned and coaxial with the compressor **202**. In order to force the compressor into the retainer **204**, the compressor **202** may be urged directly into the compressor **202** in the direction of arrow B, instead of sliding over a surface of the compressor **202**.

The actuator **200** is pushed into the compressor **202** in the same direction B as the retaining force that is exerted into the compressor **202**. As such, the direction of movement of the actuator **200** and the direction of force exerted into the compressor **202** are the same or otherwise parallel.

FIG. **3** illustrates a simplified lateral view of an actuator **300** in relation to a compressor **302** and a retainer **304**, according to an embodiment of the present disclosure. In this embodiment, the compressor **302** may hook over portions of the compressor **302**. For example, the compressor **302** may include a handle **306** connected to outer beams **308** that hook onto outer edges **310** of the compressor **302**. In order to securely retain electrical contacts through deformation of the retainer **304**, the handle **306** of the actuator **300** is pulled in the direction of arrow B.

The actuator **300** is pulled into the compressor **302** in the same direction B as the retaining force that is exerted into the compressor **302**. As such, the direction of movement of the actuator **300** and the direction of the force exerted into the compressor **302** are the same or otherwise parallel.

FIGS. **1-3** show and describe examples of actuators. It is to be understood that various other types of actuators that urge a compressor into a retainer may be used.

FIG. **4** illustrates an axial cross-sectional view of an electrical connector assembly **400** having an unsecured electrical contact **402**, according to an embodiment of the present disclosure. The electrical connector assembly **400** includes a main housing or shell **404** that defines an internal contact-retaining chamber **406**. The main housing **404** may include one or more actuator tracks **408** that are configured to moveably retain one or more actuators. An actuator is not within the actuator track **408** at the position shown in FIG. **4**. Instead, the actuator is in a disengaged position (in relation to a compressor **410**). The contact-retaining chamber **406** houses the electrical contact **402**. For the sake of clarity, only one electrical contact **402** is shown in FIG. **4**. However, it is to be understood that various other electrical contacts **402** may be housed within the contact-retaining chamber **406**.

The electrical contact **402** may include a barrel **412** integrally connected to a reduced diameter stud **414**. One or more electrical leads **416** are secured to the stud **414**, such as through soldering, bonding, or the like. The barrel **412** includes an open-ended internal chamber **418** that is configured to receive a reciprocal feature of another electrical contact (not shown). Various other types of electrical contacts other than shown may be used. For example, the electrical contact may be or include an eye-of-the-needle contact, a deflectable contact beam, a pin, socket, and/or the like.

The contact-retaining chamber **406** includes opposed lateral walls **420** integrally connected to opposed end walls (not shown in FIG. **4**), a face **422**, and an opposite surface **424** from the face **422**. A compressor **430** may be positioned within the contact-retaining chamber **406**. The compressor **430** may be formed of a rigid, non-deformable material, such as a hard plastic or metal. The compressor **430** includes an exposed surface **432** having a width that is generally as wide as the internal diameter of an opening **434** of the contact-retaining chamber **406**. The exposed surface **432** connects to outer edges **436** that connect to an internal peripheral shoulder **438** that connects to a reduced width retainer-contacting beam **440**. As shown, a contact channel **442** is formed through the compressor **430**. The electrical contact **402** is positioned within the contact channel **442**.

A deformable, resilient retainer **450** is positioned between the compressor **430** and a fixed, rigid base **460**, which may be integrally formed with the main housing **404**. As shown, the base **460** includes a pocket **462** into which the retainer **450** seats. The retainer **450** is confined or trapped within the pocket **462** between the compressor **430** and the base **460**. The base **460** may be formed of a rigid, non-deformable material such as a hard plastic, metal, or the like. Outer ledges **466** of the base **460** are positioned around an outer edge of the retainer **450**. The outer ledges **466** seat on (or are integrally formed with) an internal ridge **468** of the main housing **404**. In the disengaged position, a bottom surface **470** of the peripheral shoulder **438** of the compressor **430** is separated from a top surface **480** of the outer ledges **466** of the base **460** by a space **482**.

The retainer **450** may be formed of a resilient material, such as rubber or another elastomeric material. As shown, the retainer **450** includes a contact channel **490** into which a portion of the electrical contact **402** is positioned. The electrical contact **402** includes one or more interstices **494**. In the disengaged position, the retainer **450** is not disposed within the interstices **494**.

FIG. **5** illustrates an axial cross-sectional view of the electrical connector assembly **400** having a securely retained electrical contact **402**, according to an embodiment of the present disclosure. In order to securely retain the electrical contact **402** within the contact-retaining chamber **406**, an actuator **500**, such as any of those described above, is moved into or otherwise within the actuator track **408** so that the actuator **500** exerts an inwardly-directed force **502** into the compressor **420**. The force **502** exerted into the compressor **420** is translated into the retainer **450**, which is trapped within the pocket **462** of the base **460**. Because the base **460** is rigid and fixed in position, the force **502** exerted into the retainer **450** by the compressor **420** causes the resilient retainer **450** to deform. For example, an internal diameter portion of the retainer **450** that defines contact channel **490** flows into or otherwise fills the interstices **494** of the electrical contact **402** (as the retainer **450** is compressively squeezed), thereby providing a positive lock with the electrical contact **402**. In this manner, the electrical contact **402** is unable to retreat in the direction of arrow **510**, because the electrical contact **402** is securely fixed in place by the deformed portions of the retainer **450** that are disposed within the interstices **494**. As such, the electrical contact **402** is securely retained in position without the need for a bulky molded retention feature or the like.

The actuator **500** may be disengaged to release the electrical contact from secure engagement with the retainer. For example, as shown in FIG. **5**, the actuator **500** may be released. As such, the compressor **420** retreats in the direction opposite to the arrows **502**, and the electrical contact **402** is no longer securely retained by the retainer **450**.

FIG. **6** illustrates a perspective top view of a retainer **600**, according to an embodiment of the present disclosure. The retainer **600** may include a main body **602** formed of a resilient material, such as rubber. The main body **602** may be sized and shaped to fit within a pocket of a base. The main body **602** may include a plurality of contact channels **604** that are configured to receive portions of electrical contacts. The number of contact channels **604** may equal the number of electrical contacts within an electrical component, such as an electrical connector assembly. Alternatively, the number of contact channels **604** may be less than a total number of electrical contacts within an electrical component. The retainer **600** may include more or less contact channels **604** than shown.

FIG. **7** illustrates a perspective top view of a retainer **700**, according to an embodiment of the present disclosure. The retainer **700** may include a plurality of retainer elements **702**, each having a contact channel **704**. Thus, for each electrical contact within an electrical component, a separate and distinct retainer element **702** may be used. The retainer **700** may include more or less retainer elements **702** than shown.

FIG. **8** illustrates a flow chart of a method of retaining electrical contacts within an electrical component, according to an embodiment of the present disclosure. At **800**, an actuator is urged into a surface of a compressor. As the actuator is urged into the compressor, at **802**, the exerted force of the actuator is translated into a resilient retainer that is trapped or otherwise sandwiched between the compressor and a base, such as within a pocket of the base. In response to the compressor being forced into the retainer, the retainer deforms at **804** through the translated force and fills one or more interstices of an electrical contact. At **806**, the electrical contact is securely retained in position through the deformed portion of the retainer within the one or more interstices of the electrical contact.

FIG. **9** illustrates a front view of an electrical connector assembly **900**, according to an embodiment of the present disclosure. FIG. **10** illustrates an axial cross-sectional view of the electrical connector assembly **900**. Referring to FIGS. **9** and **10**, the electrical connector assembly **900** includes a main housing or shell **902** that includes a contact-retaining chamber **904** that houses a plurality of electrical contacts **910**. As shown, the main housing **902** may include a cylindrical shaft having one or more threaded outer surfaces **911**.

An actuator **912**, in the form of a threaded cap, may be threadably secured to an upper portion of the main housing **902**. The actuator **912** may include, or be connected to, a compressor **914** positioned over a deformable, resilient retainer **916**, which, in turn, may be positioned over a fixed, rigid base **918**, which may be an integral base portion of the main housing **902**. In order to securely.

As the actuator **912** is rotatably engaged in the direction of arc **920**, for example, the threadable interface between the actuator **912** and the main housing **902** moves the actuator **912** downward in the direction of arrow **922**, which forces the compressor **914** into the retainer **916**. As the retainer **916** is compressed between the actuator **912** and/or the compressor **914** and the base **918**, the retainer **916** securely retains the contacts **910**, as described above. Accordingly, the electrical connector assembly **900** shown in FIGS. **9** and **10** may be rotatably engaged to secure the electrical contacts **910** is a retained position.

As described above, the retainer is configured to be deformed when compressively sandwiched between the compressor and the base, such as when the actuator is urged into the compressor. As the retainer deforms, the deformed portion of the retainer fills or otherwise moves into the one or more interstices formed on or in outer portions of the electrical contact, thereby securely locking the electrical contact in position. The deformed portion of the retainer within the interstice(s) of the electrical contact provides a resistive force that prevents or otherwise resists the electrical contact from dislodging out of an electrical component. Alternatively, the retainer may not be positioned in relation to one or more interstices of an electrical contact. Instead, the force exerted into the retainer by the compressor may simply cause the retainer to compressively constrict around an outer portion of the electrical contact, thereby securely retaining the electrical contact in position.

Thus, embodiments of the present disclosure provide practical systems and methods of efficiently retaining electrical contacts within a high density array or pattern, for example.

While various spatial terms, such as upper, bottom, lower, mid, lateral, horizontal, vertical, and the like may be used to describe embodiments of the present disclosure, it is understood that such terms are merely used with respect to the orientations shown in the drawings. The orientations may be inverted, rotated, or otherwise changed, such that an upper portion is a lower portion, and vice versa, horizontal becomes vertical, and the like.

It is to be understood that the above description is intended to be illustrative, and not restrictive. For example, the above-described embodiments (and/or aspects thereof) may be used in combination with each other. In addition, many modifications may be made to adapt a particular situation or material to the teachings of the disclosure without departing from its scope. Dimensions, types of materials, orientations of the various components, and the number and positions of the various components described herein are intended to define parameters of certain embodiments, and are by no means limiting and are merely exemplary embodiments. Many other embodiments and modifications within the spirit and scope of the claims will be apparent to those of skill in the art upon reviewing the above description. The scope of the disclosure should, therefore, be determined with reference to the appended claims, along with the full scope of equivalents to which such claims are entitled. In the appended claims, the terms "including" and "in which" are used as the plain-English equivalents of the respective terms "comprising" and "wherein." Moreover, in the following claims, the terms "first," "second," and "third," etc. are used merely as labels, and are not intended to impose numerical requirements on their objects. Further, the limitations of the following claims are not written in means—plus-function format and are not intended to be interpreted based on 35 U.S.C. §112(f), unless and until such claim limitations expressly use the phrase "means for" followed by a statement of function void of further structure.

What is claimed is:

1. A system for securing one or more electrical contacts within an electrical component, the system comprising:

an actuator configured to be moved into a retaining position in which a retaining force is exerted into a compressor, wherein the retaining force is transmitted to a resilient retainer to securely retain one or more electrical contacts within the electrical component.

2. The system of claim **1**, further comprising:

a main housing defining a contact-retaining chamber;

a base fixed within the contact-retaining chamber,

wherein the resilient retainer is supported on the base and positioned around at least a portion of the one or more electrical contacts, and

wherein the compressor is disposed within the contact-retaining chamber, wherein the resilient retainer is positioned between the base and the compressor.

3. The system of claim **1**, wherein the resilient retainer securely retains the one or more electrical contacts by deforming and filling one or more interstices of the one or more electrical contacts in response to the actuator moving into the retaining position.

4. The system of claim **1**, wherein the resilient retainer is formed of rubber.

5. The system of claim **1**, further comprising an actuator track that moveably retains the actuator.

6. The system of claim **1**, wherein the actuator is configured to slide over the compressor into the retaining position.

7. The system of claim **1**, wherein the actuator comprises a plunger that is configured to be pushed into the compressor.

8. The system of claim **1**, wherein the actuator is configured to be pulled into the compressor.

9. The system of claim **1**, wherein the actuator is configured to be rotated into the retaining position.

10. An electrical connector assembly, comprising:

a main housing defining a contact-retaining chamber and including an actuator track;

a rigid base fixed within the contact-retaining chamber;

a resilient retainer formed of rubber and supported on the base and positioned around at least portions of electrical contacts;

a rigid compressor within the contact-retaining chamber, wherein the resilient retainer is positioned between the base and the compressor; and

a moveable actuator moveably secured within the actuator track, wherein the moveable actuator is configured to be moved into a retaining position in which a retaining force is exerted into the compressor, wherein the retaining force is transmitted to into the resilient retainer to securely retain the electrical contacts within the electrical component.

11. The electrical connector assembly of claim **10**, wherein the resilient retainer securely retains the electrical contacts by deforming and filling one or more interstices of the electrical contacts in response to the moveable actuator moving into the retaining position.

12. The electrical connector assembly of claim **10**, wherein the moveable actuator is configured to slide over the compressor into the retaining position.

13. The electrical connector assembly of claim **10**, wherein the moveable actuator comprises a plunger that is configured to be pushed into the compressor.

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